

Tare/tang dyrking i Norge: status og planer fremover

ASuReMacro verkstova 15. mars 2023

Øravik, Færøyene

Gunhild Borgersen, NIVA

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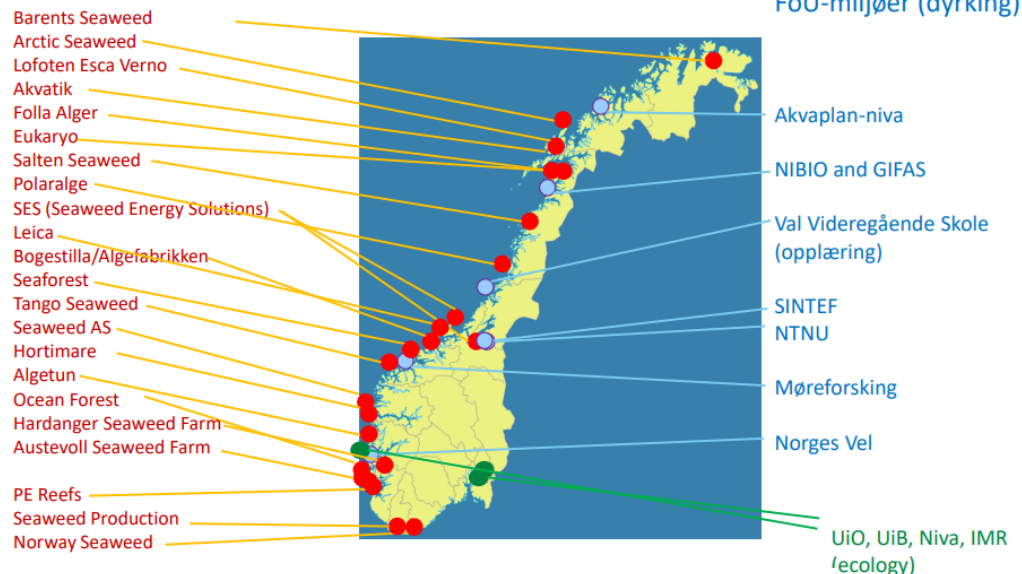
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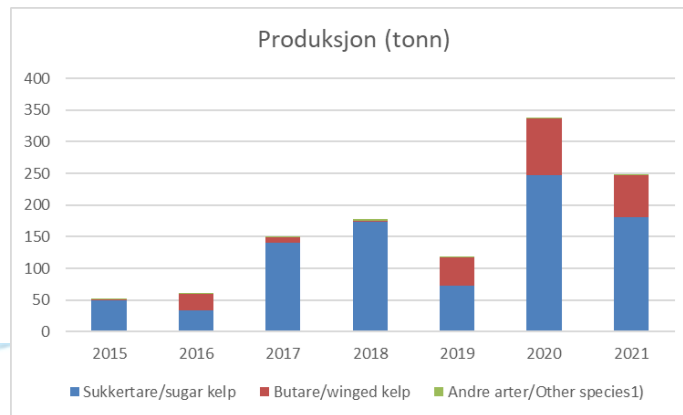
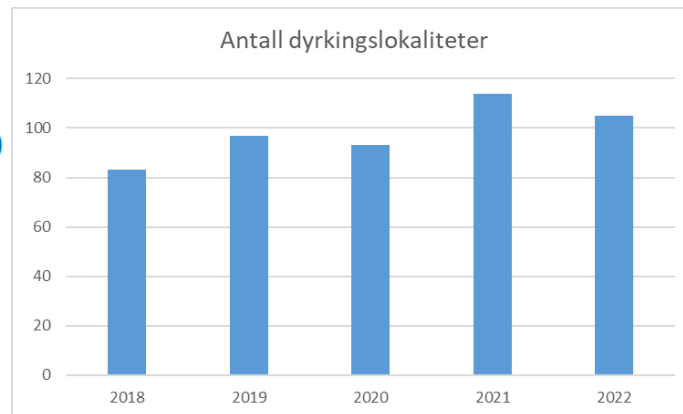
Gunhild Borgersen, NIVA

Tare/tang dyrking i Norge

Taredyrkere i Norge (2019)



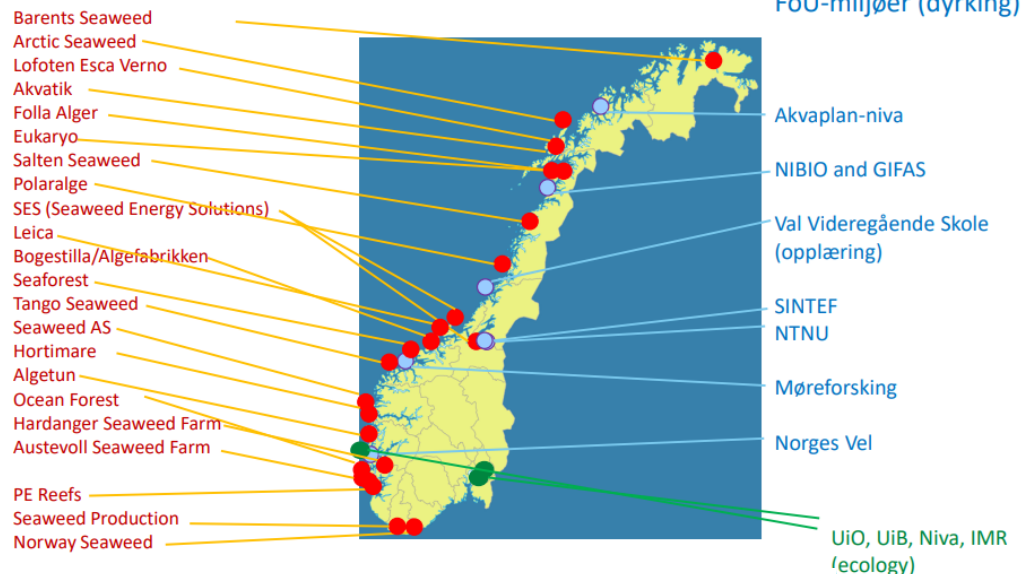
250 tonn biomasse i 2021



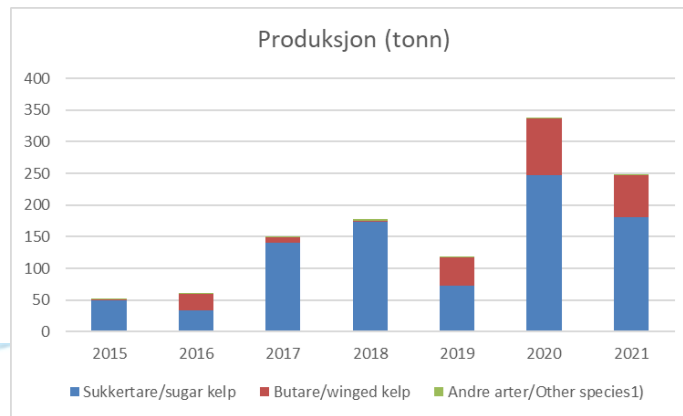
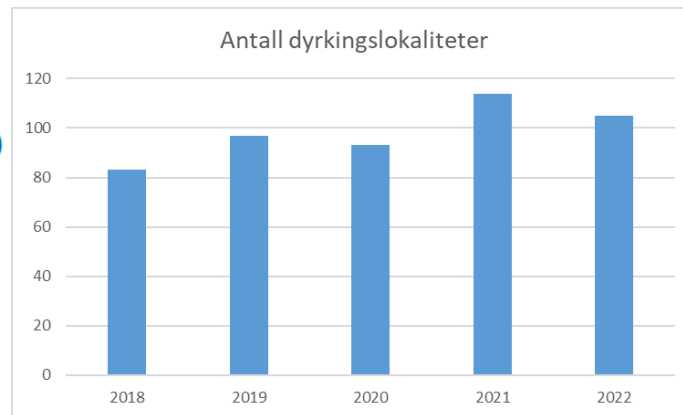
Tare/tang dyrking i Norge

20 mill
tonn¹

Taredyrkere i Norge

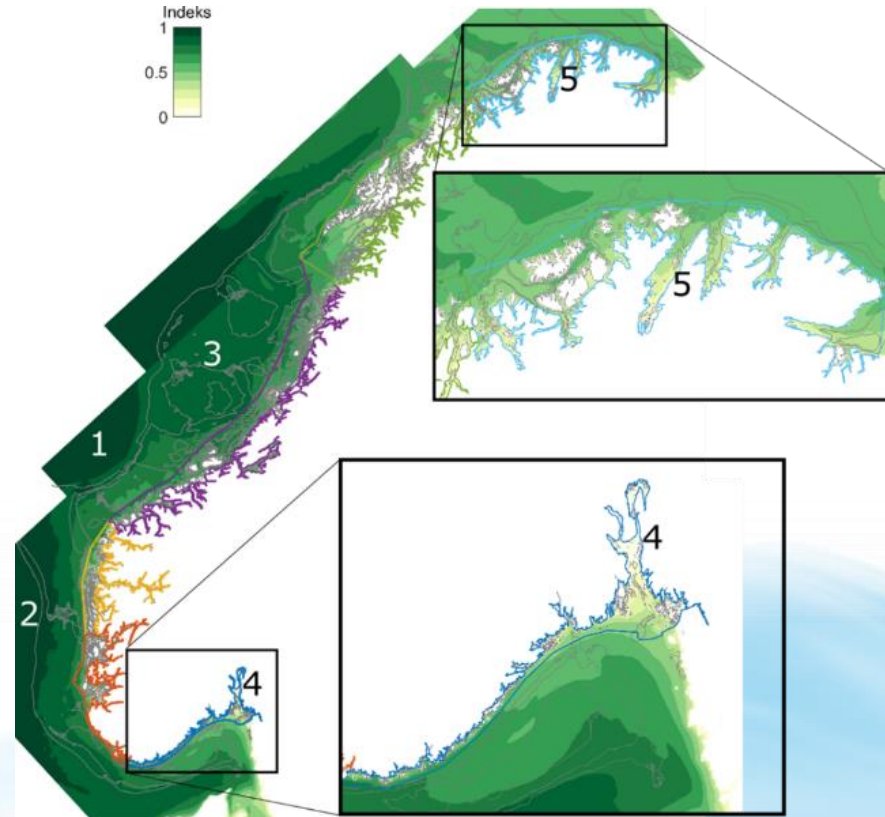
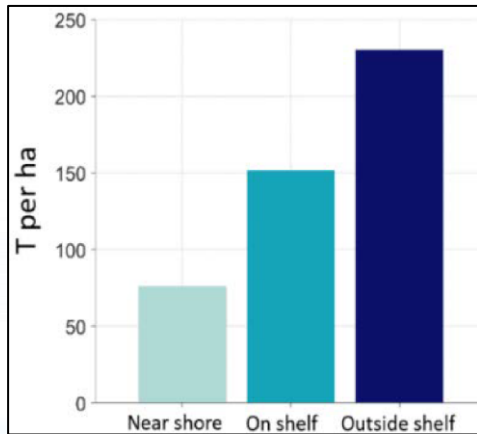


250 tonn biomasse i 2021

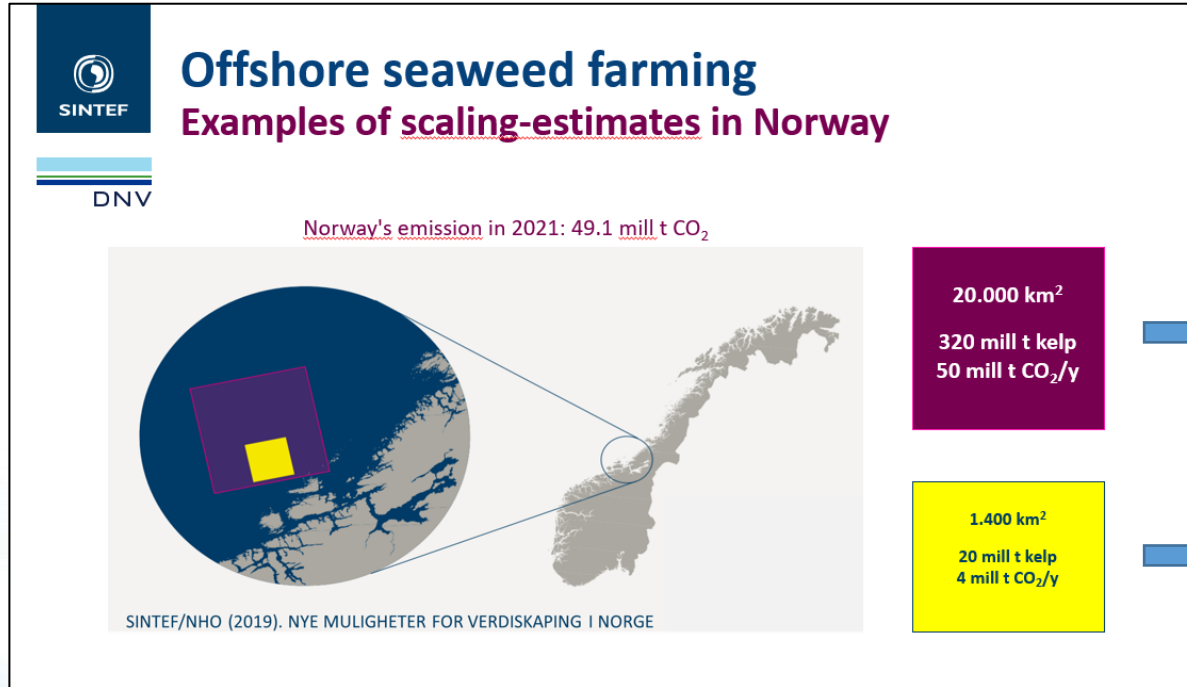


Dyrkingspotensial i Norge

- Høyest potensiale for tangdyrking offshore



Dyrkingspotensial i Norge





SINTEF



DNV



Dyrking av sukkertare, en naturbasert metode for aktiv karbonfangst

Seaweed Carbon Solutions – a joint industry project





Seaweed Carbon Solutions

Joint Industry Project

GOAL: Develop **scalable** technology for open ocean **seaweed-CDR** (carbon dioxide removal) with a potential for removal of **1 mill ton CO₂ in 2030** by climate positive products or solutions.

- Test **sea farm modules** under offshore conditions
- Test **sinking at sea and biochar on land** as carbon storage
- Assess positive and negative **environmental impacts**
- Quantify actual and potential **net CO₂-removal**
- Outline seaweed **CO₂-offset** mechanism and business cases



PILOT 2022-2024

5 M€ budget

Option for DEMO 2025-2027

Open for more partners

Possible CDR solution

Biochar made from seaweed for different carbon storing applications

Seaweed Carbon Solutions
Joint Industry Project



Photo: Jörunn Skjermo, SINTEF Ocean



Photo: Kathrin Weber, SINTEF Energy Research



Production potential kelp biochar:

- 600-800 tons per km² sea surface

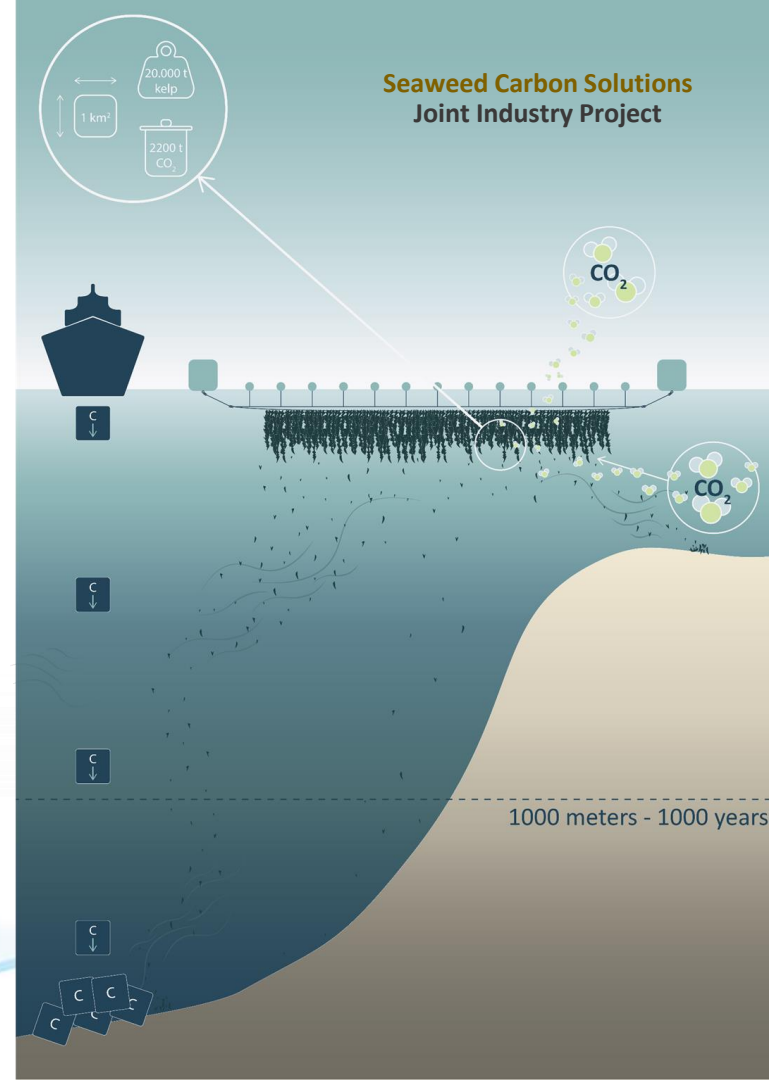
Possible CDR solution

Sinking of kelp biomass for long term storage in sediments

Deponering av (store) mengder tarebiomasse på havbunnen kan gi

- dårlig økologisk tilstand
- oksygenmangel
- endring i naturlig biologisk mangfold
- spredning av uønskede arter og gener

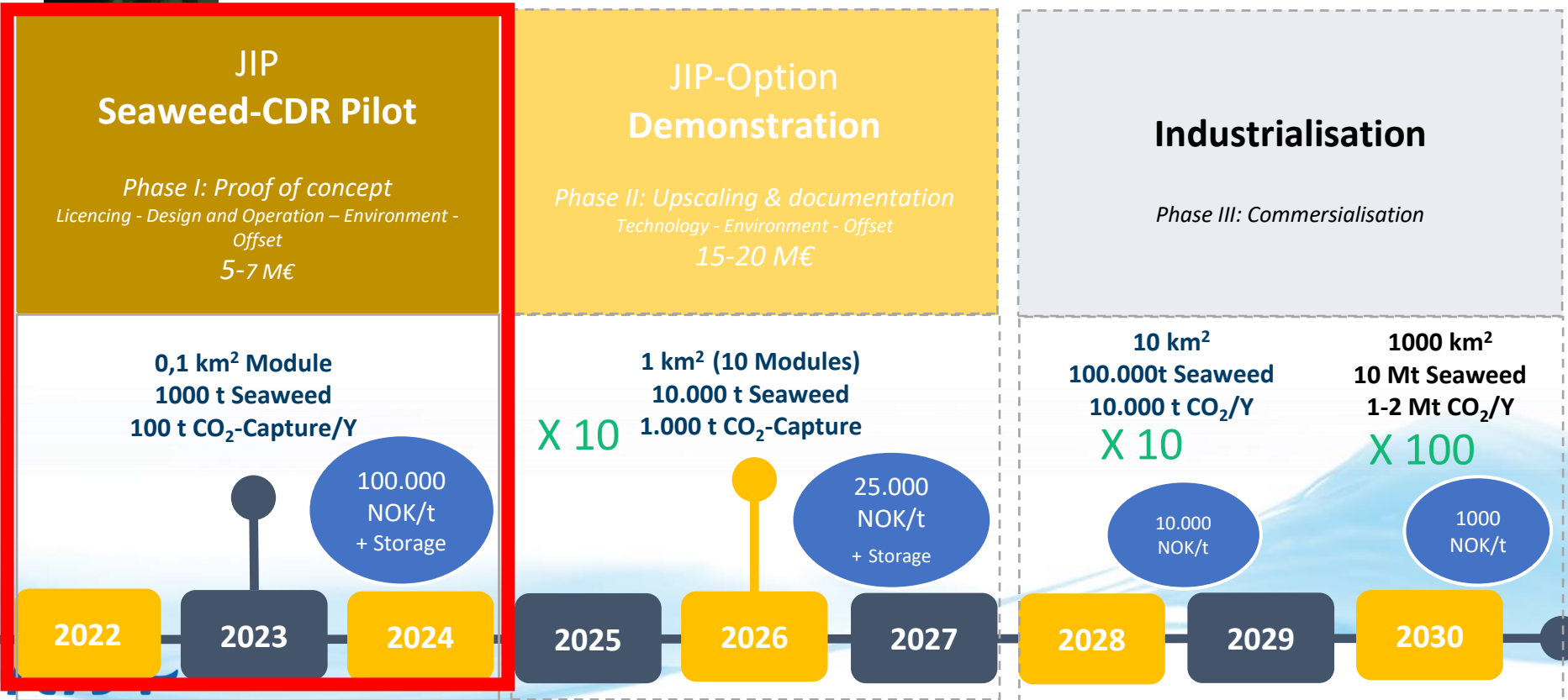
Må overvåke miljøeffekter



Seaweed Carbon Solutions

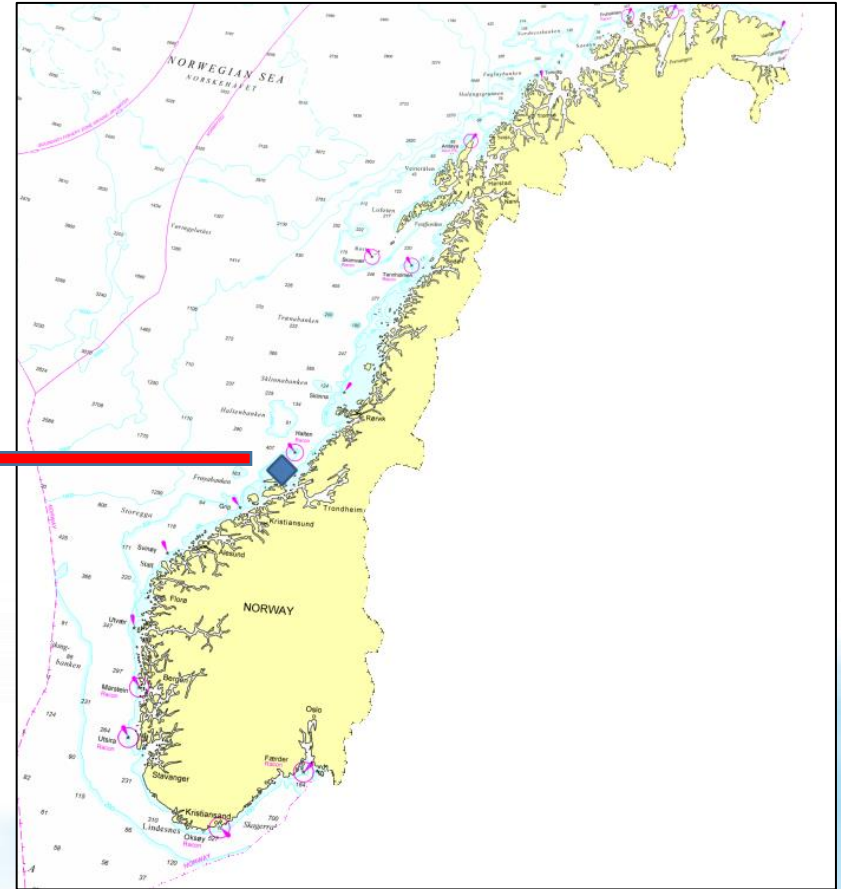
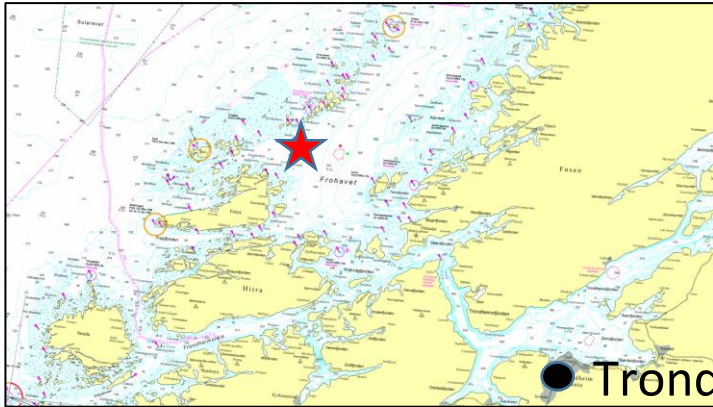
Joint Industry Project

Timeline – JIP & Industrial development



Offshore pilotanlegg

Det søkes om etablering av sjøanlegg på **650 da** for inntil **800 tonn** biomasseproduksjon. Totalt areal inkludert fortøyningsareal er **800 da**



Environmental impact

- Monitoring of the effects of dissolved nutrients removal by the large scaled biomass production.
- Monitoring of the seaweed farm as a temporary habitat.
- Evaluation of effects on the benthic ecosystem under the farm.
- Quantify particulate organic carbon (POC) released from farms
- **Base-line surveys prior to production**





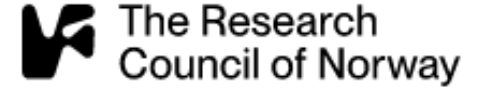
SINTEF

GP SEAWEED

New products from cultivated seaweed
for blue-green value-chains
(2023-2025)

GP Seaweed

New products from cultivated seaweed for blue-green value-chains

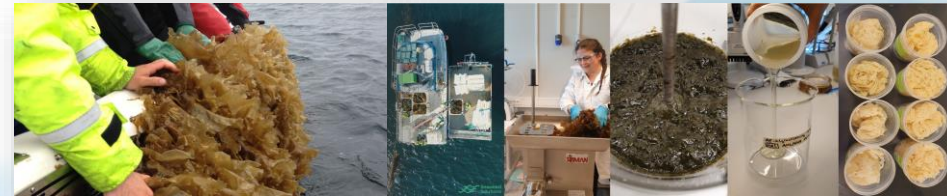


Bulk food ingredient <ul style="list-style-type: none">• Preservation• Iodine reduction• Biomass sorting	Functional feed ingredient <ul style="list-style-type: none">• Polysaccharides• Fermentation• Gut health
Tailored kelp biomass Ecosystem interactions and climate assessment	
Packaging materials <ul style="list-style-type: none">• Bioplastic• Films and rigid materials	Soil improvement & carbon storage <ul style="list-style-type: none">• Biochar• Functional compounds



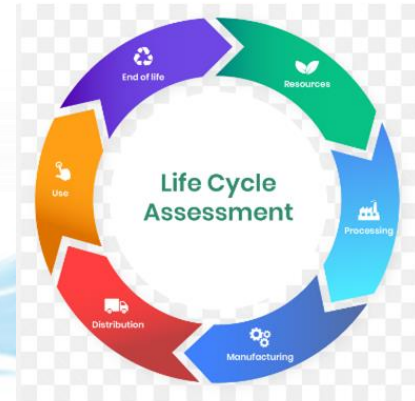
Felleskjøpet

CircleGreen



Ecosystem interactions and climate assessment

- Assessment of biodiversity, alien and threatened species associated with kelp farms
- Disease in seaweeds – effects on production and potential environmental stressor
- Reduced GHG emissions – quantify carbon removal
- CO₂-emissions related to the processing and production processes
- Mathematical modelling



Oppsummering

- Tare dyrking i Norge: oppskaleres og flyttes offshore?
- Økt produksjon krever store arealer, og risiko for negative miljøkonsekvenser øker
- Tare dyrking kan være et positivt klimatililtak
- Takk for meg!